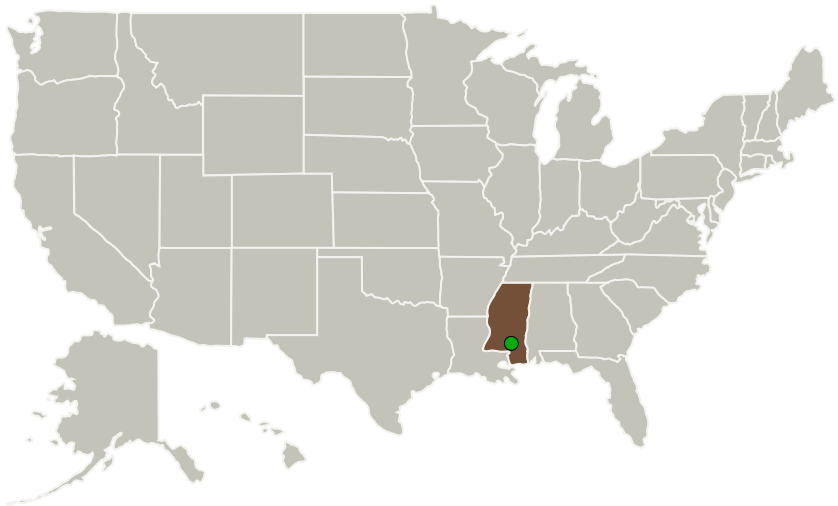
Energy Efficient LED Spectrally Matched Smart Lighting, Phase I

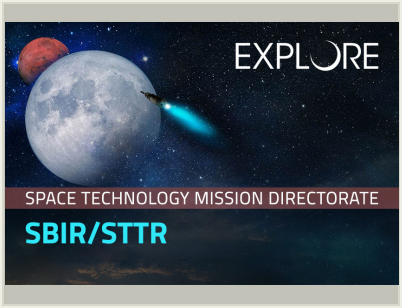
Completed Technology Project (2012 - 2013)

Project Introduction

Innovative Imaging and Research has teamed with the University of Southern Mississippi to develop a novel energy efficient smart light system. Smart lighting adds an occupancy sensor, photosensor, controller, and dimming unit to a light source and has been shown to save up to 50% of the energy required to power traditional lighting in existing buildings and up to 35% in new construction. Our novel system has the potential to further increase energy savings and enable new functionality never before incorporated into a light fixture. Our concept turns a commonly available low cost digital camera into an imaging photosensor using calibration techniques developed for NASA and the remote sensing industry. Our concept also takes advantage of the current mobile device technology boom by using mobile devices to both monitor and process control software within the smart light. Monitoring natural light that may be present, due to a window or skylight is key to our smart light, as our system spatially and temporally adjusts the light it produces when natural light conditions change– a sustainable energy concept known as daylight harvesting. While we will initially work with white light LEDs, our concept accommodates multi-color LEDs that mix to generate white light. Our smart light will therefore be able to spectrally match the natural light found within a room by controlling each color LED separately. Tailoring light spectrums affects biochemical processes and has been shown to improve sleep patterns and academic attention. By working with mobile devices we can reduce privacy concerns and process imagery within the light sensor without recording or transmitting information. It may be desirable however to add that capability as it would enable a host of other safety functions such as general security, and fire detection.

Primary U.S. Work Locations and Key Partners





Energy Efficient LED Spectrally Matched Smart Lighting, Phase I

Table of Contents

Energy Efficient LED Spectrally Matched Smart Lighting, Phase I

Completed Technology Project (2012 - 2013)

Organizations Performing Work	Role	Type	Location
Innovative Imaging and Research Corporation	Lead Organization	Industry Women-Owned Small Business (WOSB)	Stennis Space Center, Mississippi
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
University of Southern Mississippi	Supporting Organization	Academia	Hattiesburg, Mississippi

Primary U.S. Work Locations
Mississippi

Project Transitions

February 2012: Project Start

February 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140337)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innovative Imaging and Research Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert E Ryan

Co-Investigator:

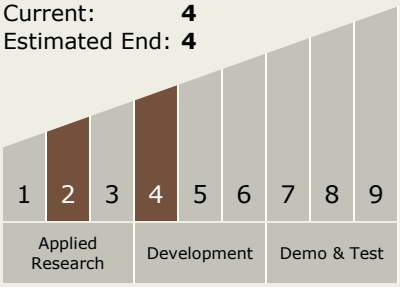
Robert E Ryan

Energy Efficient LED Spectrally Matched Smart Lighting, Phase I

Completed Technology Project (2012 - 2013)

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.5 Food Production, Processing, and Preservation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System